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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/677,239	10/03/2003	William Earl Russell II	24GA5997	9110

33727 7590 09/14/2006

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EXAMINER	
FRISBY, KESHA	

ART UNIT	PAPER NUMBER
3715	

DATE MAILED: 09/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

Office Action Summary	Application No.	Applicant(s)	
	10/677,239	RUSSELL ET AL.	
	Examiner	Art Unit	
	Kesha Frisby	3715	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 October 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-34* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-34* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *03 October 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date *5/23/2005*.

4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claims 6 & 23 recite the same claim terminology. One of these claims should be cancelled. Claim 8 should end with a period. Claim 14, "determined" should be –determined--. Appropriate action is required.

Claim Rejections - 35 USC § 101

2. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-34 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Claims 1, 19 & 34 appear to be an abstract idea rather than a practical application of the idea. Claims 1, 19 & 34 do not result in a physical transformation nor does it appear to provide a useful, concrete and tangible result. Therefore, claims 1, 19 & 34 appear non-statutory. None of the dependent claims 2-18 & 20-33 correct this problem therefore they are also rejected. Please see MPEP 2106 for guidance.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-34 are rejected under 35 U.S.C. 102(b) as being anticipated by Russell (EP 1113457 A1).

Referring to claim 1, Russell discloses receiving user input to modify one or more design inputs used in creating a response surface, the response surface defining relationships between the design inputs and operational outputs of at least one or more aspects of a core design (column 1 lines 21-37); and generating a reactor simulation based on the response surface for the core design and the modified design input (column 5 lines 6-22).

Referring to claim 2, Russell discloses further comprising: accessing the response surface for the core design from a database (abstract).

Referring to claims 3 & 20, Russell discloses wherein the design inputs include at least one of control blades positions over time, bundle types of fresh fuel, loading pattern of exposed fuel, and water flow through the reactor core (for ex: column 1 lines 4-11 & lines 31-37).

Referring to claims 4 & 21, Russell discloses wherein the operational outputs include at least one of critical power ratio (CPR), shutdown margin (SDM), maximum average planar linear heat generation rate (MAPLHGR), maximum fraction of linear power density (MFLPD), hot excess reactivity, radial and axial power peaking, peak fuel rod and bundle exposure, Uranium utilization as measured by reactor energy output produced (in mega-watt-days) per kilogram of Uranium-235 loaded (for ex: column 18 lines 40-46).

Referring to claims 5 & 22, Russell discloses wherein the generating step generates the reactor simulation in real time.

Referring to claims 6 & 23, Russell discloses wherein the response surface includes information defining a plurality of predictors, each predictor predicting one of the operational outputs based on one of the design inputs (column 10 line 45- column 11 line 4).

Referring to claim 7, Russell discloses wherein the generating step uses one or more predictors associated with the modified design input to generate new operational outputs (column 6 lines 2-7).

Referring to claims 8 & 24, Russell discloses wherein each predictor is one of a second order polynomial and a linear function (for ex: column 18 lines 19-23).

Referring to claim 9, Russell discloses further comprising: providing feedback to the user on the generated reactor simulation (column 3 lines 11-47: trial-and-error basis).

Referring to claims 10 & 25, Russell discloses wherein the providing step provides an old objective function value for the core design prior to modification of the design input and a new objective function value for the core design after modification of the design input (for ex: abstract and claim 1 part d).

Referring to claims 11 & 26, Russell discloses wherein a same objective function is used to determine the old and new objective function values (for ex: abstract and claim 1 part d).

Referring to claims 12 & 27, Russell discloses wherein the same objective function is the objective function used to create the core design (for ex: abstract and claim 1 part d).

Referring to claims 13 & 28, Russell discloses wherein the same objective function is a different objective function than an objective function used to create the core design (for ex: abstract and claim 1 part d).

Referring to claims 14 & 29, Russell discloses wherein different objective functions are used to determine the old and new object function values (for ex: abstract and claim 1 part d).

Referring to claims 15 & 30, Russell discloses wherein the providing step provides a worst case value for at least one of the operational outputs (this can be accomplished during the trial-and-error basis).

Referring to claims 16 & 31, Russell discloses wherein the providing step provides the worst case value for one or more operational outputs selected by the user (this can be accomplished during the trial-and-error basis).

Referring to claims 17 & 32, Russell discloses wherein the reactor being simulated is a boiling water reactor (for ex: column 4 lines 24-27).

Referring to claims 18 & 33, Russell discloses wherein the reactor being simulated is a pressure water reactor (for ex: column 6 lines 53-58).

Referring to claim 19, Russell discloses comprising: identifying a response surface, the response surface defining relationships between design input and operational outputs of at least one or more aspects of a core design (abstract & column 1 lines 21-37);

inputting a modification to a design input of the core design (column 1 lines 21-37); receiving one or more reactor simulation results for a reactor simulation of the core design with the changed designed input (column 6 lines 17 & 18 & column 12 lines 52-56).

Referring to claim 34, Russell discloses comprising: operating a nuclear reactor using a reactor simulation generated based on a response surface for a core design and a modified design input received from a user (column 5 lines 6-22), the modified design input being a modification of a design input used in creating the response surface (column 1 lines 21-37), the response surface defining relationships between the design inputs and operational outputs of at least one or more aspects of the core design (abstract & column 1 lines 21-37).

Citation of Pertinent Prior Art

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Berta (U.S. Patent Number 5,200,144) teaches a simulated nuclear reactor fuel assembly.

Distler et al. (U.S. Patent Number 4,828,787) teaches an apparatus for simulation of the operation of a pressurized water nuclear reactor.

Chao et al. (U.S. Patent Number 6,931,090) teaches a method of establishing a nuclear reactor core fuel assembly loading pattern.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kesha Frisby whose telephone number is 571-272-8774. The examiner can normally be reached on Mon. - Wed. 7-3pm, Thu. 6:30-4pm & Fri. 7-4pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Olszewski can be reached on 571-272-6678. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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